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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/677,600	10/02/2003	Mark A. Meltser	8540G-000145	8227
27572	7590	10/30/2006	EXAMINER	
HARNESSE, DICKEY & PIERCE, P.L.C.			WILKINS III, HARRY D	
P.O. BOX 828			ART UNIT	
BLOOMFIELD HILLS, MI 48303			PAPER NUMBER	

1742

DATE MAILED: 10/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/677,600	Applicant(s) MELTSER, MARK A.	
	Examiner Harry D. Wilkins, III	Art Unit 1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 19-23,25-35 and 44-56 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 19-23,25-35,44,45,50 and 56 is/are rejected.
- 7) ☒ Claim(s) 46-49 and 51-55 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status

1. The objection to claim 20 has been withdrawn in view of Applicant's correction of the typographical error.
2. The rejection of claims under 35 USC 112, 1st paragraph have been withdrawn in view of Applicant's removal of claim limitations "at thousands of pounds per square inch" (claim 19) and "1,000 psi" (claim 45).
3. The rejection of claims under 35 USC 102 based on da Rosa has been withdrawn in view of Applicant's changes to the scope of claims 19 and 45.

Specification

4. The disclosure is objected to because of the following informalities: in paragraph 21 of the specification as filed, lines 7-8, "pressure vessel 56" should read "pressure vessel 26".

Appropriate correction is required.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claim 50 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement and/or is rejected under 35 U.S.C. 112, second

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paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification fails to utilize the word "isolated" or variations thereof. Further, since "isolated" is not defined by the specification, it is unclear what is meant by this term. Does this term mean that there is a valve 60 disposed to close off the cathode side to prevent fluid communication of the cathode side with the interior cavity of the pressure vessel? Or does it mean that the cathode side is physically removed from the interior cavity? It is the Examiner's assumption that this claim is meant to define subject matter that there is a valve or similar equipment for selectively isolating the cathode side from being in fluid communication with the interior cavity of the pressure vessel, and examination will be based upon such assumption.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 19-23, 25-35, 44, 45 and 56 rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,690,797) in view of Sioli (US 4,758,322).

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Harada et al teach (see figure 2) an electrolyzer system including a pressure vessel (7) with an electrolyzer (1) located within the pressure vessel, a pressurized water source (11) and a flow path (7B) to feed the pressurized water into the pressure vessel. The pressurized water is supplied to only the anode side of the electrolyzer through an inlet (2) and is fed by pump (16). The electrolyzer uses the water and electric current to produce hydrogen and oxygen.

Harada et al does not teach the maximum pressure at which the gases maybe produced (equivalent to the pressure within pressure vessel (7)), and only mentions that the differential pressure between anode and cathode sides is kept below 0.5 kg/cm^2 (~7 psi). However, since Harada et al clearly suggest that the pressure of the produced gas was increased, one of ordinary skill in the art would have expected the pressures at which the system operated (i.e.-the pressure within the pressure vessels (7 and 32)) to be capable of operating at at least 1000 psi.

The differences between the disclosure of Harada et al and the presently claimed invention is that (1) Harada et al teach that the electrolyzer was set-up such that the high-pressure water was fed only to the anode side of the electrolyzer and not both sides and (2) the pump for feeding water to the electrolyzer was located outside of the pressure vessel.

With respect to (1), it should be noted that Harada et al do teach (see col. 21, lines 46-52) that any electrolyzer was suitable for use, not just the one described in the specification.

Sioli teaches (see figures 2, 3 and 8 and Example 2) that a conventional set-up for water electrolyzers was to flow water on both sides of the solid polymer membrane instead of merely only to one side of the membrane.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the system of Harada et al to have used a conventional electrolyzer that fed water to both sides of the membrane instead of just the anode side because the multiple cell electrolyzer of Sioli provided the advantage of increased production capacity.

With respect to (2), Harada et al teach a pump (16) feeding pressurized water to the electrolyzer. However, Harada et al do not teach that the pump was located within the pressure vessel. One of ordinary skill in the art would have found it obvious to have relocated the pump (16) from an external position to the interior of the pressure vessel (7) for the purpose of reducing the footprint (i.e.-the horizontal surface area covered by the apparatus) of the system to reduce the amount of space necessary for the system. This rearrangement of parts is considered obvious in view of MPEP 2144.04.VI.C. Applicant has failed to provide an unexpected result that is achieved by placing the pump within the pressure vessel. The rearrangement of the pump from an external position to an internal position would not modify the operation of the device.

Regarding claim 20, Harada et al in view of Sioli teach that each side of the electrolyzer would have included an inlet and an outlet, wherein each inlet received water and the first side outlet routed water (containing hydrogen) out of the pressure vessel and the second side outlet routed water (containing oxygen) out of the electrolyzer and into the pressure vessel.

Regarding claims 21 and 22, the system of Harada et al included a pressure retaining valve (44) in the first flow path for controlling (regulating) the pressure of the first side stream.

Regarding claim 23, the system of Harada et al further included a separator (32) located in the first flow path and the valve for controlling the pressure, the separator allowing separation into water and gas through first and second outlets. It would have been obvious to have recycled the water from the separator to the pressure vessel in order to have reduced wasting of water such as shown by Harada et al in figure 3.

Regarding claim 44, the valve 44 was a closed-loop regulator that operated by selectively allowing gas in the separator (32) to flow through the valve by comparing the differential pressure across the valve. Although Harada et al fail to teach a pressurized storage device located downstream of the regulating valve (44), Harada et al does teach that 41A is a gas supply port for delivering hydrogen gas to a site where hydrogen is consumed. One of ordinary skill in the art would have found it obvious to have added a pressurized storage device to the system to permit a buffer of hydrogen gas to be stored or to allow batch-wise transporting of the hydrogen in canisters.

Regarding claim 25, the source of pressurized water is a pump.

Regarding claim 26, the electrolyzer included an anode side and a cathode side.

Regarding claim 27, Harada et al teach regulating the flow of water into the electrolyzer through a pump 16.

Regarding claim 28, the system of Harada et al included a level indicator (21) and that the source of pressurized water selectively feeds water based on the level detected.

Regarding claim 29, Harada et al teach a pressure indicator (29). However, the indicated pressure did not permit selective supplying from the source of pressurized water. However, one of ordinary skill in the art would have found it obvious to have selectively supplied more pressurized water to the pressure vessel if the pressure within the vessel (the pressure indicated by the pressure indicator) dropped below a minimum acceptable gas pressure to thereby increase the operating pressure.

Regarding claim 30, the system of Harada et al included a flow path (24) from an upper portion of the pressure vessel and a pressure regulating valve (28).

Regarding claim 31, the pressure regulating valve and the source of pressurized water controlled the pressure inside the pressure vessel (7).

Regarding claims 32 and 33, the system of Harada et al would have been capable of operating at the claimed pressures in order to produce hydrogen and oxygen streams at the desired pressure. The prior art recognized that electrolyzers under pressure, with low differential pressures, were capable of operating at extremely high pressures, such as 150-1000 atmospheres as evidenced by da Rosa.

Regarding claim 34, the system of Harada et al operated with a pressure differential of less than 0.5 kg/cm^2 ($\sim 7.11 \text{ psi}$).

Regarding claim 35, the electrolyzer of Harada et al was submerged within the water in the pressure vessel.

Regarding claim 45, Harada et al teach the pressure vessel, an electrolyzer as claimed within the pressure vessel, a pressurized water source (combination of 8 and 9), a flow path for the pressurized water to flow into the pressure vessel, a pump (16) operable to circulate the pressurized water within the interior of the pressure vessel.

Harada et al teach that the electrolyzer was set-up such that the high-pressure water was fed only to the anode side of the electrolyzer and not both sides.

However, it should be noted that Harada et al do teach (see col. 21, lines 46-52) that any electrolyzer was suitable for use, not just the one described in the specification.

Sioli teaches (see figures 2, 3 and 8 and Example 2) that a conventional set-up for water electrolyzers was to flow water on both sides of the solid polymer membrane instead of merely only to one side of the membrane.

Therefore, it would have been obvious to one of ordinary skill in the art to have adapted the system of Harada et al to have used a conventional electrolyzer that fed water to both sides of the membrane instead of just the anode side because the multiple cell electrolyzer of Sioli provided the advantage of increased production capacity.

The combination of Harada et al with Sioli provides a pump operable to circulate the pressurized water within the pressure vessel through both the anode and cathode sides of the electrolyzer.

With respect to the limitation that the pump generated a continuous flow of pressurized water through the anode side and a selective flow of pressurized water through the cathode side, a continuous flow of pressurized water through the cathode side is still considered to be selective, since one of ordinary skill in the art would have

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had to have selected continuous flow. Applicant has failed to include any structure (such as valve 60) which could provide intermittent flow of pressurized water through the cathode side, as such, Harada et al in view of Sioli meet all of the structural limitations of this claim. It is noted that "intermittent" and "selective" are not the same thing.

Regarding claim 56, Harada et al teach a pump (16) recirculation of the pressurized water to the electrolyzer. However, Harada et al do not teach that the pump was located within the pressure vessel. One of ordinary skill in the art would have found it obvious to have relocated the pump (16) from an external position to the interior of the pressure vessel (7) for the purpose of reducing the footprint (i.e.-the horizontal surface area covered by the apparatus) of the system to reduce the amount of space necessary for the system. This rearrangement of parts is considered obvious in view of MPEP 2144.04.VI.C. Applicant has failed to provide an unexpected result that is achieved by placing the pump within the pressure vessel. The rearrangement of the pump from an external position to an internal position would not modify the operation of the device.

Allowable Subject Matter

10. Claims 46-49 and 51-55 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter: the prior art fails to provide a teaching or suggestion of a flow regulator in the

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fluid conduit from the circulation pump (16) to the cathode side of the electrolyzer while leaving the second conduit to the anode side unimpeded. The prior art merely teaches feeding the water to the anode and cathode side continuously and provides no motivation for selectively controlling only the feed to the cathode side. Based upon the Examiner's assumption of the scope of claim 50, such feature would require the ability to selectively close the conduit leading to the cathode side. Thus, that claim, if rewritten to clarify the scope to overcome the 112, 1st and 2nd paragraph rejections, would also be allowable over the prior art of record.

Response to Arguments

12. Applicant's arguments filed 11 September 2006 have been fully considered but they are not persuasive. Applicant has argued that Harada et al does not teach placing the recirculation pump 16 within the pressure vessel and such rearrangement would not have been obvious because of different pump requirements.

In response, the rearrangement of parts has been held to be obvious, absent a showing of unexpected results, when there is some motivation to perform the claimed rearrangement. See MPEP 2144.04.VI.C. In the present case, the Examiner has set forth a motivation for the rearrangement of the location of the pump, and Applicant has merely argued that the prior art does not teach placing the pump within the pressure vessel. Applicant has failed to point to any evidence that the change in location of the pump results in any difference in operation of the claimed apparatus. With respect to different pump specifications required by placing the pump within the pressure vessel,

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selection of a different commercially available pump would have been well within the ability of one of ordinary skill in the art.


Additionally, with respect to Applicant's arguments about claim 29, the feed pump 9 of Harada et al **must** have generated a pressure above the pressure within the pressure vessel. If the pump did not generate such a pressure, it would have been incapable of feeding water to the interior of the pressure vessel.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy V. King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Harry D Wilkins, III
Primary Examiner
Art Unit 1742

